

OTT (Isaac)

Medico-Chirurgical  
College,  
Physiological Laboratory,  
Philadelphia.

DR. BROWN-SEQUARD.

By ISAAC OTT, M.D.,

Professor of Physiology in the Medico-Chirurgical College, Philadelphia.

An introductory address to the students of the Medico-Chirurgical College  
of Philadelphia, October 1, 1896.

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The faculty of the college have selected me to give the introductory address at the opening of this semester of the school. Had I been consulted I could have given them much better advice as to their choice. But as there was no way to retreat I presume some subject must be inflicted upon you.

In the selection of a subject this evening I have been governed by a desire to give a more extended notice of the life of a man who occupied a prominent position in America, England and France. I feel that he has not quite received the amount of recognition in this country that his merits deserve, and while I may add but little to it, yet I shall attempt it, however feeble it may be. Besides, he was a friend of mine whom I highly esteemed. I refer to Brown-Sequard, a name you have doubtless heard. He was a Creole, born in 1817, in the Isle of Mauritius, a dependency of France. He was a posthumous child. His father was a Philadelphian and a sea captain by the name of Brown. His mother was a Creole lady by the name of Sequard. His father died on a voyage to the East Indies.

In his early life he styled himself Edward Brown-Sequard. After the '50s he signed himself Charles Edward Brown-Sequard. The data of the early years of his life are wanting. After the death of his father his mother made a living sufficient to bring up her child. At the age of 15 he became a clerk in a store. While a clerk he began to write pieces for the theatre, romances and poetry. At the age of 20 he persuaded his mother to embark for France.

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He arrived in Paris in 1838. He had a letter of recommendation to Charles Nodier, to whom he wished to present a romance, which Nodier read, but advised him to leave romance alone. This good advice was like similar advice given to Bernard, who came to Paris with a five-act tragedy.

Brown-Sequard's life, while in itself a romance, was turned toward the consuming passion of his life—that of medicine. At that period (1838) the illustrious Magendie was in the zenith of his fame, although quite aged. In the second year of medical study he began to manifest a great passion for physiology, and worked with his preceptor, Martin-Magron, repeating his master's experiments. Then his mother died, whom he adored, and for a long time he was incapable of doing anything, and commenced the wandering life which was so extraordinary in a person occupied with physiology. After traveling considerably he embarked for his native country, and afterward returned to Paris, where he obtained his degree of medicine in 1846 at the age of 29.

In 1849 he was assistant physician to a cholera hospital. At the age of 35 he left France, having been concerned in some machinations antagonistic to the government. Arriving in New York he gave French lessons and a course in physiology. He was elected Professor of Physiology at Richmond, 1854-55.

By the kindness of Dr. W. B. McCaw, late Dean of the Medical College of Virginia, I have obtained some information about his life in Richmond. His letter reads as follows:

"I was very intimate with him, and worked with him in many of his vivisec-

tions. He was the most expert operator on the living subject I ever saw, and his dogs, rabbits and guinea pigs were cauterized and handled in the most artistic way. He was mostly engaged with a comparison between the drug opium and the new bromides, chloral and that class of remedies. By trephining the skulls of guinea pigs he studied the effects of opium and narcotics on the dura mater. Alternating with chloral and bromides he proved that the opiate always engorged the membranes of the brain, while chloral bleached the dura mater.

"Ever since that time the profession has recognized the fact and acted upon it, as in the sudden convulsions of children and the uremic convulsions of Bright's disease.

"The enthusiastic nature of Brown-Sequard shows us his whole life and bearing. Simple-minded and guileless, he was truth itself as far as he saw it. His most affectionate nature made dear friends wherever he was."

He left Richmond because he had no time for original work. The news that he had been awarded a prize at Paris caused him to decide to return to France. Next we hear of him in charge of a cholera hospital in his birthplace. While here he was awarded a gold medal for his devotion and services during the epidemic. In 1855 he was a teacher of physiology in New York and a practicing physician.

In the same year he returned to Paris, and, in common with Charles Robin, he furnished a private laboratory, where he passed nearly two years. He had some students, as Rosenthal, of Vienna; Westphal and Czermack. In 1857 and 1858 he was giving lectures at the Royal College of Physicians, where his fascinating manner, breadth and depth of knowledge of the nervous system made a powerful impression on English minds, influencing them to a more extensive study of the nervous system.

Owing to the high esteem in which his lectures were held he was asked to repeat them at Edinburgh, Glasgow and Dublin. From his great reception he established himself in London as a neurologist, having refused a chair at Glasgow on account of the bad climate. In 1861, at the age of 44 years, he gave the Goulstonian lectures. When the Hospital for Epilepsy and Par-

alysis in London, in 1861, was established, Brown-Sequard was made a visiting physician, and here it was that he instituted his bromide treatment of epilepsy, which still remains our sheet anchor, notwithstanding many substitutes, additions and alterations.

While in London he had a large practice and made money, but he could not sacrifice what he loved better than his life, the search of truth in the direction of physiology.

So he quit this life and accepted a chair at Harvard. His marriage to the niece of Daniel Webster also had weight in the determination to go to Harvard.

By the kindness of Professor Bowditch I have had the pleasure of reading his introductory address, which was delivered on November 7, 1866. He closes it with the following remarks to future investigators: "If you are seriously willing to work you can dispense with any special teaching, and what is still more important, I am sure that you must succeed. If you have the will you will soon find that scientific and practical facts abound." Have the will, he repeats, and you will soon help science, to which, I might add, that you will also do much for your own personal success. His assistant, Dr. Thomas Dwight,\* speaks of him as being extremely kind, and seemed to take an interest in his progress. He thought that young men were much attached to him by his kindness and impressed by his brilliancy and enthusiasm. In Boston he seemed to be satisfied, and Agassiz was his friend.

But he lost his wife, and this, like the death of his mother, sent him wandering about the suburbs of Paris and London, but always working at something in physiology.

But neither grief nor loss of position could quench the spirit for experimentation. Soon he went to work and found that sections of the sciatic nerve were followed by epileptic attacks; and he also discovered new facts about the spinal cord. In 1868 he founded the Archives of Physiology with Charcot and Vulpian, and he was nominated to the Chair of Experimental Pathology in the Faculty of Medicine. While holding his chair he made numerous discoveries: The hereditary transmission of nervous lesions, the centre of respiration, spinal epilepsy; that injuries

\* Personal letter.

of the nerve centres could cause hemorrhages and edema of the viscera.

During the siege of Paris he visited the United States and collected sums of money to forward to his unfortunate countrymen. Having married another American lady he gave up his chair in Paris, and in 1872 took up his residence in New York, where he proposed to practice part of his time and devote part to his researches. Here he established the Archives of Scientific and Practical Medicine. It was at this time, after some studies abroad, that I called upon Brown-Sequard to take a course with him in neuro-physiology.

But I found him unwilling on account of want of time, stating that his assistant, Dr. E. Dupuy, had just left him. He treated me cordially and gave me quite a discourse upon his researches. In 1875 he returned to London, but soon left for Paris. In 1874 he made experiments upon the thermic irritations of the cortex, lectured upon amaurosis and hemianesthesia. He gave three lectures at the Royal College of Physicians to demonstrate that the same lesion of the brain's cortex is able to produce different symptoms and in different parts of the body. He did not believe in what is called the localization theory: "that each part of the brain is connected with a certain movement or sensation, and not with any other."

He believed that inhibition and dynamogeny would explain these phenomena, and while localization is established yet inhibition and dynamogeny will still come more to the front as time rolls by. It was not that he had made a mistake and tried to uphold it rather than admit in his later years his error that he hammered away with experiments to establish the inhibitory-dynamogenic theory against that of localization.

He found it a heavy task, as he admits in a letter to Dr. J. Ogle in 1879. He was then 62 and wrote as follows: "My lecturing and some patients take all my time. I have a very much harder fight for the doctrines relating to the brain than I had at the time I first became acquainted with you for the doctrines relating to the spinal cord. If I did not love truth much more than comfort, ease and quietness I would give up the painful, heavy task I have given myself. So long, however, as I have breath or power and mind and body

I shall continue the efforts begun in London in 1861 in my Goulstonian lectures."

This letter shows that he had the fibrous, mental and physical power which makes a man. So great was his enthusiasm for the carrying on of physiological investigation that he often made himself very sick in his studies upon digestion when he swallowed pieces of sponges attached to a thread for withdrawal so as to obtain gastric juice.

At another time he had drawn from his arm about a half a pound of blood, to be injected into the arm of a decapitated criminal in order to study the effect of arterial and venous blood upon the tissues. When a man will undergo such injuries we know that he is terribly in earnest in his work.

And I say to you that if you wish to succeed well you also must be terribly in earnest. For nearly fifty years he sacrificed everything for his love of science. He did not make researches for renown or the sensation of being celebrated, for he was simplicity itself in all things. In 1876 he married a lady of Geneva, Switzerland. At this place he was offered the Chair of Physiology, now held by another old giant, Schiff. But the death of Magendie's successor, Bernard, left that chair for Brown-Sequard, which he accepted and held for sixteen years up to the day of his death.

#### PRIVATE LIFE.

Was there ever a man who loved to move from place to place more than our illustrious friend? He crossed the Atlantic over sixty-six times. In private life he seemed to be taken up with his pursuit. In 1886 I had the great pleasure of spending an hour with him in Paris. Although he was about to go to Nice he seemed very cordial and complimented me upon the work I had done on lines somewhat like his on inhibition.

He ventured forth upon explanations of his ideas of inhibition in the brain. Finally, I had to withdraw as I feared he would not see Nice on that day. Before leaving I asked him why no photograph of him existed in the studios of Paris, stating that Charcot's could be found everywhere. He replied that he had never had but one photograph taken, and that was for a dear friend of his, the Emperor of Brazil.

He retired at 8 P. M. and rose at 3 A. M., entirely because these hours suited his work. This fact led to a rather annoying

occurrence to a friend of mine in Baltimore, who invited a number of his friends to call on a certain evening at his house to meet Brown-Sequard. When the guests arrived Brown-Sequard had retired, and no persuasion would make him come down and meet the guests. He cared for nothing but physiology; for money he was absolutely indifferent. For example, I may mention that an American gentleman asked him while in Havre to go to Italy to see his son. After inquiry he found that it was not a case in his line, so he refused, suggesting another physician. But the American stated that it was Brown-Sequard he wanted, and offered an enormous fee of \$50,000, but he refused to go. At another time he was offered a fee of \$1000 to go from London to Liverpool, but he replied that he would be in Liverpool next day on his way to New York, and that he would see the patient. His fee would be five guineas. He died far from wealthy as a necessary consequence.

#### SCIENTIFIC LIFE.

His thesis for the doctorate was "Researches and Experiments Upon the Physiology of the Spinal Cord," 1846. These experiments were performed in a miserable chamber, without fire, in the winter. He was very poor, living upon bread and water, sharing these with his animals to be experimented upon. These were truly black years, as his friend, Eugene Dupuy, styles them. This thesis signalled the new fact that the reflex activity of the spinal cord was nearly annulled after separation from the brain, and then gradually increased. He also brought out the fact that sensory impressions travel especially by the gray substance and not by the posterior columns. The number of his articles when offered for admission to the French Academy was 435, many of them being large treatises upon the nervous system.

During the first ten years of his medical life he published sixty-six articles; in his second decennial, thirty-five; in the third, sixty-eight, and in his fourth decennial, two hundred and sixty-six. I shall now take up his most important discoveries.

He established in an unassailable manner, contrary to the classic opinion, that conducting fibres of sensation or feeling decussate in the spinal cord, so that a transverse section of one-half of the spinal cord is followed by paralysis of motion on the

side of section or loss of sensation on the opposite side. This enables surgeons to diagnosticate the existence of certain one-sided lesions of the spinal cord. He also discovered the relation existing between the tissues and the blood, that the energy and histological properties of the tissues of a recently-amputated limb could be restored by the injection of defibrinated blood and oxygen. He was the first physiologist to find out that blood vessels contracted under the action of electricity upon certain nerves. There is no doubt of his discovery of the vaso-constrictors and their mode of action upon the blood vessels and the temperature of the corresponding parts. He also found out that epilepsy could be experimentally produced and could be inherited. In the late years of his life he tried to establish that the inhibitory action of certain lesions on irritation of certain parts of the nervous system had an action upon the activity of certain other parts of the nervous system seated at a distance from the site of original injury.

In 1858 he published some researches made with Professor Francis Gurney Smith, of this city, that starch could be changed into sugar in the stomach even when it contained a very acid gastric juice. In 1856 he showed that the extirpation of the adrenals soon caused death. He also was among the first to suggest the injecting of glandular tissue and the theory of internal secretion. These are a few of his important discoveries.

Glandular physiology, in its widespread ramifications, applied to other ductless glands of the body, has revolutionized many parts of physiology and pathology. It is only in its infancy. Its maze of metabolic changes hold many facts to be discovered. The secretion of the ductless gland opens up new avenues of investigation, which will enrich the science of physiology and the practical application of these facts in therapeutics. We have a silent and hitherto unsuspected secretion going on which plays a most important and unknown part in our economy.

Very potent remedies are the ductless glands, where but a few thousandths of a grain of a gland, like the pituitary, greatly elevates arterial tension. Several of these animal extracts, as I have shown, are thermogenic agents; others are not. Some,

like the thyroid, greatly depress the rate of the heart.

When we see the cures produced by the thyroid powder, or one of its active principles—*iodo-thyrine*—in myxedema, cretinism, obesity, and in my own experience of a cure of sclerema; when we see the changes of acromegaly arrested by the pituitary; Addison's disease improved by the adrenals, we cannot help seeing their power. We see in the action of these extracts the simple external manifestations of the great forces at play in the nutrition of the economy. When Brown-Sequard was laughed at in regard to his orchitic extract—yes, even reviled—all his friends knew he was right, but his quackish imitators for the greed of gain exaggerated its qualities, so that the reaction necessarily fell upon the originator. But his researches and facts about it live, while his revilers are numbered among the great unknown. Dr. Pregl, by a series of most elaborate researches, has shown that the orchitic extract increases one's neuro-muscular power. It is stated that he spent nearly 1000 francs in the gratuitous distribution of the orchitic extract.

He loved science for itself, and as president of the Biological Society of Paris he sincerely rejoiced in every new fact received before it as though he had been the author himself.

From 1846 to 1894, for forty-eight years, his original genius gave him no rest but to quench it by research, whether in Richmond, Philadelphia, New York, Boston, London or Paris. At all times and at all places he worked away without any external driving power, without any pecuniary reward, rather with much pecuniary loss.

I say without these things he worked for all he was capable of at any spare moment that he had at what he loved more than position, power or money; that is the science of physiology. *Laboremus* was the watchword of *Septimus Severus*; *laboremus* was the ensign on his high standard until the day of his death. In judging from what I personally observed he suffered but little from ill health; he was of sturdy frame, good color in his cheeks, with brown eyes with a great sheen in them, behind which rested a powerful mind. I say it was with his great physical power that he was enabled to let his mind carry on the numerous researches.

He was not a man of one idea which, when exhausted, closed his career; but in whatever direction he worked he threw a bright and illuminating effulgence through the gifts of intellect, personal fascination and magnetism.

He will remain unforgotten by his numerous friends, scholars and admirers. And while I am making the attempt in this short sketch to give a picture of this great personality I feel how difficult a task I have undertaken in regard to the position of a peculiar person like Brown-Sequard. We must remember that physiology, compared with the other sciences, is comparatively young, and it is only in the last seventy-five years that it has been cultivated.

All sides of phenomena interested Brown-Sequard. He understood that many problems of the nervous system could be solved by the cultivation of neighboring subjects in anatomy, physics and chemistry, although he did hardly any microscopic work. Although in 1847 Ludwig, Helmholz, Du Bois-Reymond and Bruecke were cultivating the physical origin of all phenomena, we see Brown-Sequard influenced by the same spirit, a spirit, by the way, cultivated by Magendie, and who subjected everything to what he called the experimental method, that is, physical and chemical tests in contradistinction to the vitalistic ideas of Bichat.

I say that these ideas of Magendie were propagated when Germany was still plunged in the shadows of philosophy. It was under the influence of these teachings that the mind of Brown-Sequard was moulded in the direction of the experimental method which he continued to use all his life. In his last years he discovered as many new facts as at any other period of his life.

As to his honors, he was a member of many learned societies. He succeeded Vulpian in the section of medicine in the Academy. He was a laureate of the Institute, with the biennial prize of 1885. In 1886 he obtained the Baly medal of the Royal College of Physicians, and in 1881 was made an LL. D. by the University of Cambridge. Death as before removed his estimable wife, who, for eighteen years, was most devoted to him. This great grief and the burden of seventy-seven years, were too much for him to bear, and he succumbed to an attack of apoplexy.

If we compare Brown-Sequard with Ludwig or Bernard, we find that he did not have as great originality of discovery in him or the many-sided ability to attack new problems. But we can say of Brown-Sequard what Burdon-Sanderson has said of Ludwig: "There were not a few of them who, for the first time in their lives, came into personal relation with a man who was utterly free from selfish aim and vain ambition; who was scrupulously conscientious in all that he said and did; who was what he seemed and seemed what he was, and who had no other aim than the advancement of science, and that advancement saw no other end than the increase of human happiness."

And now a few words to our students. In the name of the faculty I extend to all a most hearty welcome to this most active and progressive college, a college young in years, vigorous in growth, expansive in its future and annually putting forth a fruitage of good and well-educated young men.

As to the arrangement of the college you will find some changes the walls have undergone—a transformation—a new coat—a sort of ecdysis.

The laboratories of pathology, chemistry and experimental therapeutics have been transferred to Eighteenth street to meet the increased size of our classes. The histological laboratory has been enlarged, both for the purposes of histology and for an important factor in our school—free recitations. A children's department of the hospital has been opened up on Eighteenth street.

You will have a new teacher of pathology, Professor Joseph McFarland, who comes to us from the University of Pennsylvania, succeeding a graduate of the

school, Professor Sangree, who has gone to Vanderbilt University, Tennessee.

You will find here teachers thoroughly in earnest to instruct you in the art and science of medicine, for we all know that life is short and medical art is long, and especially long, to be covered in three years. But by great industry and patience you will master the foundation and details of the practice of your future life.

Remember, as to your studies that it is to do or die as regards your success in the future.

The recent success of our students in the acquirement of hospital positions shows that the students and the teachers of the college are doing good work.

Eighteen hospital positions have been obtained by the members of our last graduating class of 54. That is, one-third of the class have become resident physicians, and many of them only by a hard competitive examination. The Medico-Chirurgical College expects every man to do his duty. Do not forget that you have undertaken a heavy task, which your teachers will need to lighten.

I have just laid before you the life of a great man who worked under disadvantages much greater than I expect you to; but he reached the pinnacle of greatness, although only a sea captain's son. Humble in origin, humble all his life, as became the great man that he was, yet he acquired all the earthly honor that a medical man could aspire to.

Papers consulted: *Notice sur les Travaux scientifiques. Du Docteur C. E. Brown-Sequard. Archives de Physiologie, 1894.* *London Lancet, 1894.* *Societe de Biologie, 1894.*

